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EDITOR'S NOTES

I hate to end my first year as the editor of your journal with this issue running behind schedule, but that's the way it is. The March issue will be out a very few weeks after you read this.

In this issue you will find the first of a series of articles. This series will become a regular in all future issues. On page 3 you will find the article, co-authored by Alan Friedman, Dennis Schatz, and Cary Sneider. They, along with Ron Olowin, distributed the first issue of the POP Journal to a few dozen people at the Boulder meeting. They have offered their writings to the Planetarian on a regular basis. Their offer has been enthusiastically accepted.

JANE'S CORNER has a somewhat different look this time. You will notice that there is not one mention of any material, from anyone, on any topic concerned with planetariums. Get the message? She needs your help! Write to her and contribute.

By next issue we will hopefully be able to reinstate on a regular basis a report on the next I.S.P.E. meeting. I will keep you posted on all the latest news in each succeeding issue. I will also reinstate the "HOW TO MAKE IT" feature. It was omitted this time simply due to space restrictions.

As always, I continue to hear from a few of you. What's going on in the rest of the world? Hello, Planetarians! Are you there? Please respond! We need your help! I shall stand by on this frequency to receive your reply.

Bill Fagan
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AUDIENCE PARTICIPATION AND THE FUTURE OF THE SMALL PLANETARIUM

By Alan J. Friedman, Dennis L. Schatz, and Cary I. Sneider
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A Unique Potential for Smaller Planetariums

The most widely available source of information about current progress in science is the mass media. Although the press, radio, and television have made valuable contributions to public education, most science reporting is limited to brief headline grabbers. The nation's estimated twelve million planetarium-goers,[1] on the other hand, have the opportunity to be in a unique environment for forty-five minutes to an hour, to be involved in an intensive learning experience, and to ask questions. The planetarium is, in addition, the only institution in America which can offer regular contact between the public and a person professionally knowledgeable in astronomy and/or space science.

Of the 1100 planetariums currently operating in the U.S., about fifty are major installations (domes 41-75 feet in diameter), each serving 200 to 700 visitors at a time.[2] These major planetariums provide multi-media presentations which have been attracting a rapidly growing audience, expected to reach 10 million people a year by 1980.[3] A large planetarium's presentation can command attention and excitement, as well as provide scientific information. It is normally a lecture, often recorded, illustrated with special effects and musical accompaniment. Because of the large audience size, any interaction between the professional and members of the audience is precluded until after the program, when a few individuals can ask questions.

The remaining 96 per cent of the nation's planetariums are smaller facilities, with domes 10-40 feet in diameter, located in school districts, colleges, and museums. With a few notable exceptions, smaller planetariums today offer the same kind of passive learning experience that the large planetariums do--resulting in an identity crisis. As educational budgets are being ever more closely scrutinized, those concerned about the survival of smaller planetariums must resolve the question: "What is the educational role of the smaller planetarium?" If the answer is: "Basically the same role as large planetariums," then a smaller facility cannot economically compete with a nearby large planetarium. By 1980, only four percent of the planetariums (the largest ones) will account for about 60% of the total yearly audience.[4] The large planetariums are simply more efficient in providing these passive-audience shows.

We believe that a unique educational function the smaller planetariums can serve is to provide active audience participation in the planetarium environment. In a smaller facility, it is feasible to have audiences of

20-50 people. With these groups of manageable size, the planetarium instructor can involve the audience in activities and discussions as a normal part of every program. As we will show in the following sections, active learning is highly desirable.

Participatory Oriented Planetariums

A very exciting alternative to a passive-audience program that relies on elaborate special effects is the "participatory oriented planetarium" (POP) programs now being used at more than a dozen smaller planetariums.[5] In these audience participation programs, the visitors are actively involved in: 1) discovery-approach activities; and 2) extensive verbal interaction with other audience members and the planetarium instructor. The term "discovery" means that the visitors learn something new through their own efforts; they are not just verifying what the instructor told them. "Verbal interaction" means that the audience members may initiate discussion as well as respond to the instructor's questions.

The most important distinguishing feature of a participatory oriented program is that the audience is actively involved in thinking about the subject matter, not passively absorbing audio-visual information.

In a passive constellation show, for example, the audience sits quietly while the instructor points out constellations and describes some mythology to go with each set of stars. In a participatory constellation show, the instructor passes out simple star charts to everyone in the audience, demonstrates how to use the star charts, and then assigns a constellation to find for each section of the audience. After a group points out its constellation to the rest of the audience, the instructor describes the mythology.

In a passive show segment on motions of the sun, the instructor points out the location of today's sunset, as projectors produce the effect. In a participatory segment, each member of the audience is asked to estimate where he or she thinks the sun will set and indicate that place with markers that hang from the cove. Then the main projector produces a sunset, while the audience watches intently to see how accurate their estimates were.

A participatory presentation requires some physical preparations (e.g., star maps, sunset markers) but the trouble is usually no more than would be spent, for example, producing a "realistic" sunset effect. In the participatory activity described above, even the simplest sunset is effective, since it is the audience's participation that provides the excitement, not the special effect.

These particular examples work well with audiences of 25-35 people: a group that is not effectively served in the larger planetariums, but is very practical for smaller size domes. Additional examples of POP and bibliographical references are in a recent Planetarium Director's Handbook article. (See reference 5.)

Theory Behind the Participatory Approach

The concept of involving students in actively observing, experimenting, and reasoning grew from the theories of Swiss educator, Pestalozzi, during the nineteenth century.[6] The notion that people learn more and understand more deeply if they actually manipulate materials and discuss ideas was greatly elaborated by John Dewey at the turn of the current century. The theoretical basis for participatory education has been greatly enhanced by Jean Piaget's theory of intellectual development. Hundreds of cross-cultural and longitudinal studies strongly support Piaget's basic contention that human beings pass through an invariant sequence of stages of mental growth, and that the pace and eventual completion of intellectual maturity depends on the opportunities that a person has to interact with things and people in the environment.[7]

The clearest display of consensus about the high value of participatory education is that all of the major science curriculum development projects sponsored by the National Science Foundation (NSF) during the 1960's and 1970's (including ESS, SAPA, SCIS, HPP, BSCS, etc.) are designed to involve students actively in the process of learning.

In describing the rationale for the new NSF science curricula, Hurd[8] summarizes the claims of the participatory approach (also called the "discovery," "inquiry," "process," "problem-solving," or "hands-on" approach) as follows:

1) Children are motivated by the satisfaction they receive from finding out things for themselves, and satisfaction is recognized as an important attitude in stimulating learning;

2) since children are more personally involved with information and ideas in a discovery approach, deeper understanding of subject matter results and forgetting is reduced;

3) discovery procedures help children develop strategies of inquiry, or process skills, such as simplifying, organizing, and summarizing data, discovering relationships, and making generalizations; and

4) transfer of learning is improved.

The general argument is also applicable to adults who have little scientific background.

Educational Research on Planetarium Education

There are very few research studies of the planetarium as an educational tool. A recent article entitled "Analysis of Research on the Educational Uses of a Planetarium"[9] cites only nine studies, most of which have serious design flaws.[10] None involved POP strategies. A recent study which was both carefully designed and directly relevant to this discussion was performed by Gerald Mallon[11] to compare the effectiveness of a "live" instructor vs. a pre-recorded program. Although both presentations were "passive" planetarium programs, this study is relevant since the presence of a live instructor is

an essential part of the participatory approach. Mallon's result showed that students who attended the live presentations showed a cognitive gain significantly greater than those who attended the pre-recorded program, even though the words and intonations used, special effects, and all other identifiable variables were carefully controlled. One study comparing POP and passive planetarium education is being planned by Jack Fletcher at the University of Virginia.

Although there are few research studies which deal explicitly with the planetarium, the POP approach is based on the much larger body of research studies that have been undertaken to replicate Piaget's findings, as noted in the previous section. The implications of that research for planetarium education are that: 1) no matter how stimulating the special effects may be, a visitor cannot derive meaningful concepts from a lesson if the task involved is beyond his or her intellectual ability; and 2) by involving visitors actively in manipulating materials and discussing ideas at the appropriate level of complexity, it is possible to help them make the transition to a more advanced stage of intellectual development. It is this same body of research that led to strong government support of the participatory approach to science curriculum development in the 1960's. POP can, in fact, be viewed as an expansion of the participatory movement in science education into astronomy and space science rather than the adoption of an entirely new approach.[12]

Summary

In the midst of increasing cries for "accountability' and continuing financial crises, every educational endeavor needs to have a clear vision of its role in meeting fundamental goals. We believe POP is an effective way to substantiate the intuitive feeling of educators in small planetariums that their facilities offer something essential and unique. This is because:

1) The basic principles of participatory programming have sound research support.

2) While limited active participation could occur in a big dome with hundreds of people, the smaller facilities have overwhelming advantages for conducting activity and dialog with each member of the audience.

3) These audience participation activities involve use of the special planetarium environment and cannot be duplicated in the classroom.

We encourage Planetarian readers who are researching and/or using POP techniques to report on their work in this journal and at regional or national meetings. The Holt Planetarium (the author's institution) is currently seeking financial support for a national series of workshops in POP education. We welcome further suggestions, and will be glad to assist others who wish to increase POP popularity.

REFERENCES

1. This figure is based on a 1974 survey by Frank C. Jettner and Martin B. Richardson, "Thoughts from FCJ," Planetarian, 3, 2-3 (Spring-Summer 1974); they calculated a total attendance of 11 million for 1973. Our figure is an estimate for 1976.

2. Based on CATNAP II, A Catalog of North American Planetaria, Norman Sperling, ed., ISPE Special Report No. 3 (1973); updated by a more recent estimate of Tom Hamilton, Bauersfeld's Folly, #17 (March 1976).

3. Estimate by Michael Sullivan presented in a talk, "The Role of Large Planetariums in Astronomy Education," for the Astronomical Society of the Pacific, May 22, 1976.

4. Calculated using Sullivan's estimate (note 3) and our projection of attendance at the smaller planetariums at 8 million people a year, based on the Jettner and Richardson survey (note 1).

5. The "POP" acronym was coined during the August 1975 Planetarium Association of Canada meeting in Toronto by several proponents of the technique. The original members of that POP group were Jeanne Bishop, Dale Etheridge, Samuel Farrell, Jane Geoghegan, Ron Hartman, Paul Knappenberger, Randy Mullin, Tom O'Brien, Ron Olowin, Dennis Schatz, Lee Simon, and Roger Woloshyn. One issue of the POP Journal, edited by Ron Olowin, has appeared. Further references to participatory planetarium activities and related publications can be found in an article by Alan Friedman, "Participatory Planetarium Shows, " The Planetarium Director's Handbook, #32 (May/June 1975).

6. See a review by Paul DeHart Hurd, New Directions in Elementary Science Teaching (Belmont, CA: Wadsworth Publishing Co., 1968), p. 22.

7. John L. Phillips, Jr., The Origins of Intellect: Piaget's Theory (San Francisco: W.H. Freeman and Co., 1969), Chapter 5.

8. Hurd, footnote 6, p. 18-19.

9. Dennis Sunal, in Journal of Research in Science Teaching, 13 (1976), pp. 345-9.

10. Theodore V. Smith, "The Effectiveness of Constellation Figures," Planetarian, 3 (Fall/Winter 1974), p. 74.

11. "A Pilot Study: Tape vs. Live Teaching, Science Activities, 11 (November/December 1974), p. 10-11.

12. See for example Jeanne E. Bishop, "Planetarium Methods Based on the Research of Jean Piaget," Science and Children, 13 (May 1976), p. 5-8, and Dennis L. Schatz and Anton Lawson, "Effective Astronomy Teaching: Intellectual Development and its Implications," Mercury, V (July/August 1976), p. 6-13.

STAR MYTHS OF THE NORTH AMERICAN INDIAN

By Larry Sessions

It seems strange that in a country with a vast heritage of native folklore the citizens should remain unaware of it. In the United States we have such a heritage of Indian mythology, but most teachers either ignore it completely or refer to it only in passing, favoring instead the legends of ancient Greece and Rome.

The planetarium is one place in which the public as well as the schools have been treated to an occasional taste of Indian mythology and sky lore. Many planetarians would like to prepare an Indian star program, but don't know where to look for information. It is the purpose of this article to provide some of those needed resources.

Recent work has been done in this area, resulting in programs such as The People of the Hansen Planetarium, and references will be given at the end of the article.[1]

Research into Indian star lore has been infrequent and varied. Many anthropologists knew too little astronomy to properly identify the stars and constellations in the stories they recorded, but a few definite identifications may be found scattered through many volumes.

Indian star myths, like Indian languages, were often utterly different from tribe to tribe, but nearly all Indians had a story of the Great Bear, Ursa Major. Most Indians pictured the bear with a short tail, such as those owned by real bears, but at least one Iroquois legend gave the bear a long tail and accounted for it like this:

It seems that in the beginning all bears had long, furry, and very handsome tails, The bears were very proud of their tails, and to this day the Great Bear of the sky can be seen with his giant fluffy appendage arching across the heavens. But proud as he was of his tail, the earthly brother of the Great Bear saw that his tail could be put to practical use catching fish. By dropping his tail into the water and wiggling it to and fro, he could attract many fish, which he promptly caught and ate. The bear grew fond of fish and would even drop his tail into the icy waters of frozen ponds and lakes to catch his favorite food. One winter day, however, the water was too

cold and quickly froze around the bear's huge tail, leaving him with the short, stubby one he has today.[2]

Another Iroquois myth, along with those of many other tribes, tells that the Bear was a spirit who lived in the far North, hibernating throughout the Winter in his Den, the star group we know as Corona Borealis. Some say that one time, long ago, the Bear came to earth and began terrorizing the countryside. Three braves decided to rid their people of this menace, so they started out on a hunt that they have yet to finish. It wasn't hard to track the beast and they soon found him and gave chase. The Bear, seeing his predicament, began to run in circles around the Star-That-Never-Sets (Polaris). Those hunters still chase that Great Bear, forever following but never getting any closer. To the Indians, the Bear was represented by the four stars of the cup of the Big Dipper, and the hunters were the three stars in the handle. Each Fall, the brave closest to the Bear, represented by the star known to the whites as Alioth, lets loose an arrow that hits the Bear and makes him bleed. Some of the blood drips down onto the leaves of trees and turns them red; it causes other leaves to fade yellow. This is why trees change colors in the Fall. The second brave, marked by the star Mizar, carries a pot, the star Alcor, in which to cook the Bear. The Fox or Musquakie Indians call Alcor "Hold Tight," the name of the little dog accompanying the hunters.[3]

Some Indian people saw things other than a Bear in the constellation of Ursa Major. To the Pawnee of the American Plains both Ursa Major and Ursa Minor were burial frames that move around the North Star forever.[4] The Hidatsa thought this star group looked like an ermine, with the stars representing the head, feet, tail, and burrow of this little weasel.[5] Far to the North, the Smith Sound Eskimo saw Ursa Major as a Great Caribou which looks down from the sky. But perhaps the most unusual story comes from the Blackfoot people. To them, the stars of Ursa Major were seven brothers and their baby sister who had fled to the sky to escape their older sister who had magically changed into an angry grizzly bear. According to Blackfoot story-tellers, the older sister had fallen in love with a grizzly. The girl's father, horrified with such a prospect for a son-in-law, promptly killed the animal. Now the daughter, who had gained magical powers from the bear, changed into another grizzly and killed her father and mother. Seeing this her brothers and little sister shot enchanted arrows which took them to the sky where they escaped the bear. Alcor is said to represent the smaller sister huddling close to one of her big brothers for safety.[7] As with all myths, there are other variations.[8]

Orion was another constellation known to the Indians. To the Iroquois he may be identified as "Old Man:"

A long, long time ago there lived an old man who had grown too feeble to hunt or do chores. He had, in fact, become a burden to his family, so he climbed up to the top of a high mountain and began to sing his death chant. As he sang, the people in the village below began to watch the old man, who sat there all alone with nothing but his staff and bundle. Slowly, very slowly at first, the old man began to rise into the sky. He rose farther and farther and finally took his place in the heavens. He may still be seen and

pointed out among the stars. In the Summer, "Old Man" carries the sun on a high trail up onto his mountain, but in the Winter he grows tired and lets his lazy son carry the day star down the shorter trail to the South, and the weather gets cold because the sun does not stay up long enough to warm the earth.[9]

Far to the Southwest, the Tewa people called Orion "Long Sash," a brave warrior and wise man to whom the people could turn when they were in trouble. Long ago, when trying times had come to his land, Long Sash led his people away across the "Endless Path," the Milky Way. After traveling a long way down the Path, the people began to grumble and quarrel among thenselves, so Long Sash stopped near the place of two bright stars (Castor and Pollux?) and told the people that they must stop their fighting and follow him or else leave him and go their own way. The people called this the "Place of Decision." They decided to follow Long Sash and so continued their journey. But arguments broke out again in a short time and even Long Sash began to doubt his abilities. He left his headdress in this "Place of Doubt" when he left this place, and it can still be seen as a cluster of stars (either Praesape or the Pleiades). After a great medicine dream in which Long Sash saw many things, he led his people to the "Middle Land" which is now their home forever.[10]

Blackfoot story tellers related that the two bright stars of Gemini, Castor and Pollux, represent twin brothers named "Ashes Chief" and "Stuck Behind." The twins mother was killed by a mysterious stranger while their father was away. The stranger found one of the baby boys and placed him amidst the ashes of the lodge fire, calling him Ashes Chief. He found the other child, Stuck Behind, hidden behind the lining of the tipi, and named him accordingly. Ashes Chief grew up strong and was later called "Rock." Stuck Behind grew up with a beaver family and became known as "Beaver."[11]

To the Iroquois, the Pleiades represented seven children whose parents refused to let them have a feast of their own. Angered at this refusal, the children began to dance. The more they danced, the angrier they became. In their frenzied dancing they failed to notice until too late that they were being transported to the sky where they remain to this very day.[12] Smith Sound Eskimos called this galactic star cluster "Nanook the Bear and the Hunting Dogs."[13] The Blackfoot people knew the Pleiades as the "Bunched Stars" or the "Six Brothers," and told that the stars were six poor boys who, ashamed that they had no red buffalo-calf robes (these were soft robes and considered prized possessions) went up into the sky to escape the snobbish taunts of more fortunate Indian children.[14]

The Kiowas had a legend of five stars representing the hand of their trickster-hero, Saynday. According to Kiowa tradition, Saynday was a funny looking little old man with a scraggly moustache who sometimes performed great good works and sometimes played tricks on the people, often being tricked himself (Saynday had counterparts, often Coyote, in many tribes). It seems that Saynday had finished all of his work in the world and was about to depart when he stretched forth his hand and caused five stars to appear

in the East. Whenever these stars were visible, Saynday told the people they should not tell any stories about him, for he would be looking down on them from above; but in the winter when Saynday's stars were gone, the people should tell stories to remind them of him. The stars of Saynday's hand may possibly be identified as Corona Borealis, though this is not for certain. (For the purist, Saynday stories should be told only at night in the winter and should always be prefaced with the phrase, "Saynday was coming along.")[15]

To the Shawnee Indians, Corona Borealis was known as the "Celestial Sisters" and the Pawnee people saw it as a council of chiefs. The Blackfoot called it the "Spider God."[16] Some of the Iroquois knew Corona as the den of the Great Bear.

Other constellations were known to the Indians, some corresponding roughly to those seen by the whites and some completely different. The religions of the Pawnee, who called Scorpius the "Real Rattlesnakes" and the Navajo who formed about 37 separate star groups, contain much sky lore. The Pawnee and some Southwest tribes even had star maps of a sort, but many of the star groups seen by the Indians are difficult to identify and many of the stories concerning stars are too complicated to easily fit into a planetarium program.[17]

Beliefs about the stars themselves were varied; the Mandan thought them to be diseased men;[18] the Iroquois and others believed them to be campfires lit by departed souls on their way to Heaven;[19] and the Navajo saw the stars as mica dust flung into the sky by their trickster-god, Coyote.[20] The Cherokee had an interesting story concerning the nature of stars:

Once a hunting party of Indians were camping in the mountains. During the night they saw two balls of light like stars moving along a ridge. Several nights in a row they saw these lights and upon investigation of the ridge by daylight they found two strange creatures whose round bodies were covered with downy feathers. Small heads stuck out from their bodies and sparks would fly from their feathers whenever the wind blew. Intrigued by their find, the Indians brought the creatures back to camp. By day, these odd little beings were nothing more than quiet balls of grey fluff, but at night they would glow brightly like stars. They made no move to escape until the seventh night, when they began to rise from the ground. Soon they were far up into the sky and the hunters knew that these unusual little creatures truly were stars.[21]

It is interesting to note that the Indians had certain taboos concerning the stars. The Teton Sioux, for instance, were careful never to count the stars for if one should begin to count, even mentally, and stop without finishing then he would surely die.[22] The stories of some tribes were to be told only at certain prescribed times or the people would lose favor with the gods.

The gods lived in Heaven, and some tribes like the Iroquois, thought the Milky Way was the "Pathway to Heaven." According to the Fox Indians, the

Milky Way was a river of stars. [23] The Kiowa, Cheyenne, and other plains tribes called it the dusty track on which the Horse and Buffalo once had a race through the Heavens.[24] The Hidatsa called the Milky Way the "Ashy Way," and the Cherokee thought this great band of stars was corn meal spread across the sky:

At one time, Indians to the South of the Cherokee had a mill where they made great amounts of corn meal, their staple food. One morning, however, they found that some of their meal had been stolen and for several days they noticed the same thing. They also discovered the pawprints of a dog in the soft ground near the mill, so they hid and watched the next night to see if the dog would return. Sure enough the canine thief came back and began devouring the corn meal. As soon as they saw this, the people sprang on the dog and beat him, sending him howling away to the North. As he howled, the corn meal he had in his mouth spilled and formed the band of light where now the Milky Way shines.[25]

With so many different Indian peoples there are naturally many more myths of the stars, many of which may be found in the references following. There are also many stories of the sun, moon, planets, meteors, comets and such phenomena as aurora and rainbows, but most of these are spread about in the literature and difficult to find. The Central and South American Indians had much star lore suitable for planetarium presentations, but these people perhaps have not been studied so thoroughly as their relatives North of the border. Hopefully the star legends and lore of the North American Indians presented in this paper can serve as the basis for future programs; at least they can stand as an incentive for further research into the world (and universe) of the Indian.

REFERENCES

1. M. Littmann, The People, Hansen Planetarium, Salt Lake City, 1976.

2. P. Lum, The Stars in Our Heaven, Myths and Fables, Pantheon Books, Inc. 1948, p. 41.

3. Ibid, pp. 39, 40. A. Marriott and B. Rachlin, American Indian Mythology, Crowell, 1968, p. 58.

4. C. Burland, North American Indian Mythology, Hamlyn, 1968, p. 85.

5. Bureau of American Ethnology, Annual Report, #11, U.S. Government Printing Office, 1894, p. 517.

6. C. Burland, op. cit., pp. 20, 21.

7. P. Lum, op. cit., pp. 41, 42.

8. C. Wissler, Star Legends, Science Guide No. 91, The American Museum of Natural History, 1956, pp. 8, 9, 10.

9. D. Forror, American Indian Star Legends (paper), Walter T. Schuele Planetarium, 1973, p. 3. (Available from I.S.P.E.)

10. A. Marriott and B. Rachlin, op. cit., pp. 59-62.

11. C. Wissler, op. cit., pp. 23-34.

12. S. Feldmann, The Storytelling Stone, Dell, 1965, pp. 104, 105.

13. C. Burland, op. cit., pp. 20, 21.

14. C. Wissler, op. cit., pp. 6, 7, 8.

15. A. Marriott, Saynday's People, University of Nebraska Press, 1963, pp. 87, 88.

16. H. Phillips, "Skylore of Indigenous Americans," Astronomy, Vol 4, #7, July, 1976, p. 13.

17. G. Weltfish, The Lost Universe, Basic Books, Inc., 1965, P. 436 (Ballantine edition).
A. Aveni, ed., Archeoastronomy in Pre-Columbian America, University of Texas Press, 1975, p. 101.

18. Bureau of American Ethnology, op. cit., p. 508.

19. M. Lettman, op. cit., p. 48, 49.

20. C. Burland, op. cit., p. 93.

21. Bureau of American Ethnology, Annual Report, # 19, U.S. Government Printing Office, 1900, pp. 257, 258.

22. Bureau of American Ethnology, Annual Report, #11, U.S. Government Printing Office, 1894, p. 467.

23. W. Oswalt, This Land Was Theirs, John Wiley & Sons, Inc., 1966, p. 216.

24. Bureau of American Ethnology, Annual Report, #19, U.S. Government Printing Office, 1900, p. 443.

25. Bureau of American Ethnology, op. cit., p. 259.

Addendum: add the following to footnote #9

Bureau of American Ethnology, Annual Report, #2, U.S. Government Printing Office, 1883, p. 81.

ONE OF THE FIRST PLANETARIANS: DAN SNOW

An Interview by Jeanne Bishop

At the banquet af the annual GLPA meeting, in Cleveland in 1975, Dan Snow was honored as one who has made an outstanding contribution to the planetarium profession. He was one of the first to direct a small planetarium. a Spitz model, when they became available. For 25 years he has been "Mr. Astronomy" at the Cleveland Museum of Natural History, and he has guided many new planetarium directors. Innumerable people have attended his programs over the years as his planetarium instrument and even the museum buildings have been changed. But Dan's initial philosophy to provide information and explanation of current sky events has not changed.

One August afternoon in 1976, Dan shared the following with me, while we sat in his beautiful spacious office, astronomy memorabilia visible everywhere.

"Armand Spitz was my only mentor," he said of his planetarium initiation. "He was one who could stimulate and inspire."

Dan came to this work from a job as a photographer in the Air Corps. He gives Adler Planetarium lecturer Charlie Everetts credit for introducing him to the fascinating world of planetarium operation. "Charlie incorporated renditions of Longfellow into his lectures." Charlie also introduced him to the optical and mechanical planetarium world. All this took place within the very brief time allowed with a 3-day pass.

In Cleveland, Dan took an evening astronomy course from J.J. Nassau, famous past Director of the Warner and Swasey Observatory. When Museum Director William Scheele asked for advice as they prepared to launch one of the country's first small planetariums, Dr. Nassau recommended Dan for the position of Planetarium Director. "Dr. Nassau was persuasive," Dan remembers. "I had never addressed a group and was not sure about such a responsibility."

His first planetarium was installed in 1952, an A-2 with a 20 foot cloth dome. This was the era when the Spitz salesman made commotions at gas stations with his planetarium-outfitted van. (Today's fad van renovations, in comparison, would be "outshone" by this!)

Dan, as a museum-based planetarium director, has been heavily involved with public programs from the beginning of his career. He says, "The main function of a planetarium is to transmit knowledge which will make the average person who didn't look up before look up now. Give some idea of what a person can see, and maybe he will. Give him more to comprehend on a night under a dark sky then "That's pretty." If Johnny goes out and can find Orion after a program, even if he doesn't understand retrograde motion, the visit is worthwhile."

Dan put into words what we have all come to realize: "A planetarium director requires an unusual combination of talents. He needs to know a good amount of astronomy, have an ability to express astronomical ideas in a non-technical and interesting manner, be proficient with at least small mechanical-electrical-optical phenomena, and be able to get along with children of different ages." He adds, "A presenter should not take himself too seriously. And he shouldn't over-react to a negative audience comment." (After 24 years of Christmas Star presentations, a Jewish couple strongly objected to the words "our Lord". One listens, remembers, but is not crushed.)

"Sometimes in programs we should keep our mouths shut and just let the stars roll silently." Dan's preference in music for such times, as well as for star introduction, is the quiet, mysterious type. Back in 1958 at the first national symposium of planetarium directors (at Cranbrook), Dan termed this "the darkness falls on the wings of night approach."

"Sound effects, such as bird calls, are very effective." But he cautions that one use special care that the birds are proper for the season depicted. "You'll always have some bird-watchers in your audience who will notice a discrepancy."

Dan has long been as advocate of incorporating folklore of different nations into programs. It was he who introduced me to the wonderful book by Peter Lun, Stars in Our Heaven, as I began my planetarium work. Long before most planetariums began exploring non-classical mythological alternatives, Dan had found the Chinese, Japanese, Polynesian, and Asian Indian astronomical legends. He says, "They give charm to a program, like Charlie Everstts' Longellow quotations. They balance the factual parts."

In contrast to many museum planetariums, which strive for the ultimate in multi-media productions for their public offerings, Dan continues to de-emphasize special effects, believeing that the focus should be on the presenter in relation to his audience and on a minority of well-chosen special effects. He says, "I recently saw a special landscape in one production. Yes, It dazzled, but the stars portrayed were for the wrong season! This situation is pretty grim. A planetarium should portray astronomical accuracy."

In the October, 1976 issue of Sky and Telescope, George Lovi states:

"Today there seems to be an increasing number of planetarium personnel who complain that they cannot create an effective presentation without some 200 auxiliary projectors, dozens of special effects, psychedelic flashing lights, 12-track tape machines and the like. I wish these people could have heard Henry Neely behind the console in the old days; this great lecturer was able to hold the audience's interest with only the Zeiss projector, a few slides projectors and most of all--himself."

Also, judging from the current success of astronomy programs in the National Parks, a great many people are eager to learn observational astronomy, probably the function which the planetarium can serve best. Dan Snow's program philosophy, although currently not the dominant one, is certainly one we should all re-examine. Although we have other alternatives for a variety of purposes, it would be a mistake to eliminate the observational astronomy public program, with a bare minimum of special effects.

Dan has found a new character in his audiences in recent years. "There are more young adults, college-age students, usually attending as couples." Does this indicate a greater awareness of astronomy, generated by space programs? Or, is this simply a manifestation of more leisure time? At any rate, Dan believes that the public still does not have the awareness of sky events that it should. This has been revealed in his special Saturday morning interaction programs, in which the audience is encouraged to participate.

Another renowned planetarian, Dr. Joseph Chamberlain, Director of Adler Planetarium with 27 years experience, presented the Armand Spitz Lecture for the Great Lakes Planetarium Association in Chicago on October 28, 1976.

"Why, it may be asked, should there be a planetarium? I will give you two reasons, either one of which I believe justifies the expenditure of funds and effort.

First, I believe that the oldest curiosity of man was about the stars; and I believe that this curiosity is infinitely worth satisfying because it has to do with the very stuff of which creation itself is made.

Another reason...is that it teaches us that everything in the universe takes place in compliance with external and unchanging Laws."

(Dr. Chamberlain's entire address, "Why Are We Here?" will be printed elsewhere in the Planetarian.)

In light of these criteria, Dan Snow's programs shine. The planetarium and observatory offerings of the Cleveland Museum of Natural History aim to satisfy astronomical curiosity and acquaint visitors, both public and school groups, with the physical framework for astronomical phenomena. When people attend one of Dan's programs--"They're often drawn into the planetarium by intrigue with the strange contraption in the center"--they leave with a little better understanding and appreciation of the universe about them.

MULTIDISCIPLINE PLANETARIUM INSTRUCTION

By E.Q. Carr, Herkimer BOCES Planetarium

Multidiscipline Planetarium Instruction (MPI) is student-involved science activity in the planetarium environment integrated with the natural and social sciences. Astronomy teaching/learning modules have been developed to uniquely summarize classroom instruction, serve as motivational hinge points, as cultural experiences and as instructional staging plateau for the student's own summary of his knowledge. The planetarium environment is created when the facility is used as a sky simulator, a science laboratory and a multimedia theatre.

MPI is adaptable to school system requirements. In the Herkimer BOCES the first teacher planetarium survey indicated preference for planetarium visitations of longer than 120 minutes. Further analysis reveals that the travel time to instruction time ratio, an intuitive judgement of the efficiency, was the major reason for this preference. Some of our rural schools have total travel times of 80 minutes to and from the planetarium.

Research has already demonstrated the effectiveness of the planetarium as a primary tool in constellation recognition, 1) for language vocabulary development 2) and its potential in the affective domain, 3) as indicated by Reed. The general application of the planetarium environment in motivating students is therefore warranted.

MPI is an integrating function not available in many modern schools where instruction consists of discrete disciplines involving arbitrary allotments of student and teaching time. Moreover, it performs a subtle but overt service, teacher instruction, simultaneously with the student.

MPI at the Herkimer BOCES is a continuously applied concept with instructional programs organized around prespecified behavioral objectives in the cognitive domain.

Equally important, however, is the objective of developing attitudes toward science and technology, the fundamental bases of our society.

Societal Needs

Our society is in a transitive period concerning science and technology. We have developed an insatiable appetite for the output of a high technology system. We are blasé about what technology can do but primitive in our understanding of how to use and control with any efficiency the operation of a technological system.

Indeed, technology is an awesome tool so potent that its controlled development and exploitation is essential since errors can drain our resources and threaten man's existence.

Answers to control of technology lie not in delegating responsibility to new layers of bureauacracy or abdicating to well intentioned but poorly informed activists. Rather we must raise the general level of competence of the society. Schools should develop polycompetencies, many faceted talents in students with broadened perspectives.

If the planetarium is an effective medium it can be a useful tool in this work.

Given the premises that:

1. In a high technology society undergoing rapid changes resulting from that technology, the society needs some minimum level of technological

competence to participate in decisions affecting that society and all mankind.

2. This requires a breadth of scientific knowledge and process only schools can supply.

3. A planetarium has already been observed to fill certain societal yearnings and intuitions and has potential application as a teaching tool.

4. A curriculum should be developed using this natural interest to explore scientific and social curricula needs with the planetarium as a teaching and learning tool.

Student Needs

The societal need has been described previously as an improved understanding of science and technology for intelligent participation in decision making. This requires alteration of the following attitude and behavior patterns in students:

1. Scientists wear white coats and are either good, benevolent, super-intelligent people or brilliant, mad malevolents who destroy everything that interferes with what they want.

2. Science obviously requires brilliance and superior intelligence.

3. Since most students understand they are not of these special categories, the conclude sciences are therefore beyond them. The average student, therefore, avoids the sciences or performs so poorly that there are two types of sciences, General Science and Earth Science. There are only modest cognitive goals for the average students in the General Science.

Teacher Needs

While there is no data at hand, teacher and guidance counselor attitudes often parallel those of students. Indeed, it appears that these attitudes and behaviors of students result from contacts with teacher sources.

Non-science teachers would seem then to require preparation similar to that of the students for the same reasons including sharpening critical judgement facilities in science and technology areas.

Curriculum Synthesis

An anti-science, anti-technology and anti-space reaction has been forecast in our times, partly as a reaction in outrage at excesses in applications of technology which destroy our fundamental resources, the environmental crises

resulting from thoughtless exploitation of human nature and the totally materialistic goals in living in a high technology era. Technology serves both at the source and cure of the problems, the slapping boy and panacea for the predicted disasters.

Yet even the return to nature activists have clearly identified the basic solution to technological problems-the application of fundamental technological know-how to remove the problem.

The outstanding example of this includes the technology bible of the back to nature movement-the Last Whole Earth Catalog containing such diverse technological data as herbal medicine receipts, concrete formulas and structural design data on geodesic domes covered with, of all things polyvinyl chloride, wind-driven pump and generator sources, how to build septic tanks and nurse babies, how to bake bread and do an engine overhaul.

The basic objective of the planetarium, therefore, remains science and technology. Not simply astronomy but a wide range of topics in biology, physics, geography, anthropology, mathematics, earth science, space science, cosmology, comognomy, oceanography, epistemology, selenology, chemistry, meterology, genetics, etc. The planetarium here serves as the unifying medium and the application of all the other sciences in the space-ship earth concept of environmental education and the positive expansive philosophies of space colonization.

MPI integrates elements of the present school curricula in a new synthesis for much broader concepts of man, society and expanding to the resources of the solar system rather than within the constricting bounds of a resource-limited earth.

The planetarium should accept this responsibility for discussing more positive attitudes and approaches to society's needs through a better understanding and management of technology, the nature of man and of the universe and material progress not dependent on the acquisition of resources by one nation to the deprivation of another.

The expanding society requires resource consumption without guilt. The solar system, maybe even the universe, can expand before us in our own time.

REFERENCES

1. Dean, N. and Lanck, G.M. "Planetarium Instruction Using the Open Sky Test", Science Teacher 39 (May) pp. 54-55.

2. Reed, George, "The Planetarium Experience and the Affective Domain," MAPS Conference, April, 1973.

3. Carr, C.J. and Carr E.Q., "Foreign Language Vocabulary Acquisition," (to be published)

ADVERTISING AND ENERGY CONSERVATION AT THE STRASENBURGH PLANETARIUM

By Donald S. Hall

Mike Sullivan, first director of the Reuben H. Fleet Space Theatre in San Diego, has been a pioneer in paid advertising and associated marketing research as applied to Planetariums. I have heard Mike talk on this twice and have picked his brain privately a couple of additional times. Mike agrees that if advertising works to sell soap, it ought to work to sell Planetarium shows. Because of Mike's success, I was convinced that we ought to try paid advertising in Rochester to see if it could work for the Strasenburgh Planetarium.

We began in March, 1976. Using the guide set by Mike of 10% of the budget for advertising, we realized that we would be spending (or investing) $30,000 in the course of a year; not an amount to be frittered away lightly. At this same time, we began a program of energy conservation that would result in an estimated saving of $10,000 by the end of December. After a couple of strategy meetings, we decided that we would "prime the pump" with $10,000 for a four-month period. If the investment paid off, we would then have revenue to continue investing in advertising.

Before we started plunking our money down, we surveyed planetarium audiences to find out where they got their "Cultural/Entertainment" information. We found that BY FAR the majority of them looked to the morning daily newspaper for this kind of information, with the evening paper receiving the next highest number, but only about half that of the morning paper. This was very interesting to us since the evening paper has very slightly higher circulation than the morning one. Five or six times as many of the people surveyed said that they looked to the morning newspaper more than they did to the most listened-to radio station.

Based on this information, we decided that the bulk of our advertising dollars would be going to the morning paper, but we would buy radio time on five of the six most popular stations. (We omitted one because its time was much more expensive than the rest.) The money was spent roughly in proportion to the results of our audience survey. Our expenditures were not as great as we had anticipated so we managed to advertise for six months instead of four, all on the original $10,000.

We had good advice; we proceeded in a rational and scientific manner, and we lost our shirts. Planetarium attendance did not rise significantly, or even a little but, so that at the end of August 1975 we ceased advertising. I wanted some time to think, without watching money slip between my fingers. I was still convinced that if advertising sold soap, it could sell space, but how were we going wrong?

First, we decided that we would put our money exclusively into the morning newspaper since it was here that we felt we had the greatest chance of return. It was possible that our ads were just too small to compete on the movie page with the frequently larger ads there. The second decision we made was not to advertise every day. Our money is now being invested in just two large newspaper ads that appear on Friday and Saturday morning. Friday the movie theatres run their biggest ads, so we just followed their lead. This means that we have shows on Friday, Saturday and Sunday to pick up the results of the ads. We give a lot more shows on those days than we do on, say, Monday, Tuesday, and Wednesday, so we provide our potential audience with more times to visit with us.

In order to calculate if an ad is paying for itself and providing a return, accurate and detailed attendance records are necessary. At present, we look at the average number of people in the Friday, Saturday and Sunday shows as compared to the average number of people in these same shows for the previous six year period. When child, student, adult, senior citizen and guest admissions are averaged, the result comes out to $1.23. We find that we must have about 22 more people in each weekend show (times the average admission rate) to pay for the weekend ads. If we have more than this, then the ad has paid for itself and brought us a return on our investment.

Since the last half of November, 1975, we have been proceeding in this way, have been generating more income than anticipated, and more income than we have been spending on newspaper ads. In the first six months of 1976, our attendance is up almost 20,000 people. This has the potential of giving us the best year ever in terms of public attendance.

We have found that our paid advertising does not interfere with public service announcements on radio and television, but does give us a bit more control over our own destiny than trusting to word of mouth and the right kind of weather.

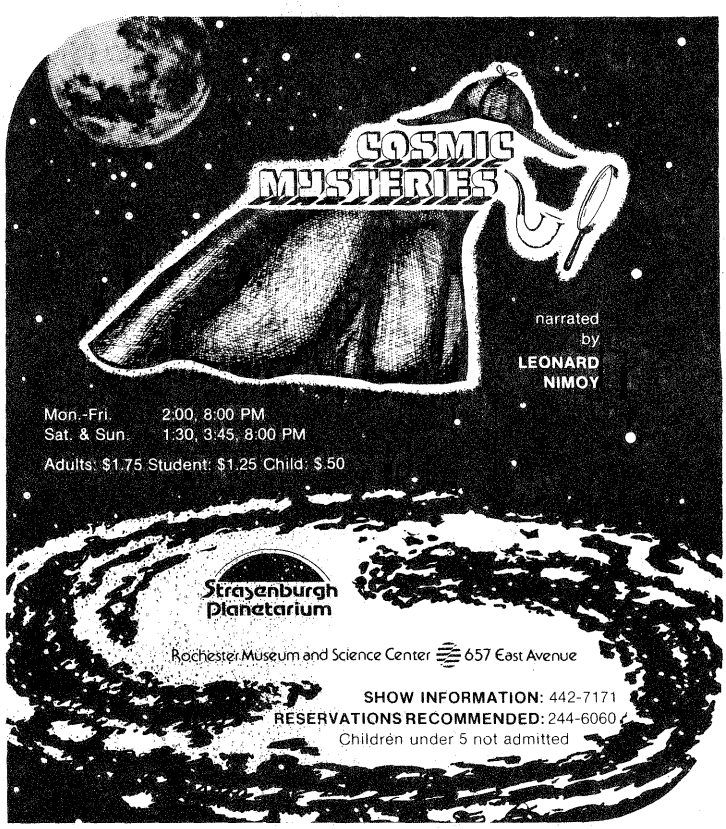
Closely interwoven with our experimentation with advertising is saving money through energy conservation. When the Planetarium was built it was equipped with the most sophisticated kind of climate control called a reheat system. This system would humidify, dehumidify, heat and cool as needed, sometimes simultaneously, to maintain very close tolerances of temperature and humidity. We first modified the controls to cut the system back during hours when the building was not occupied, from approximately 11 p.m. to 7 a.m. A second later, modification to the controls gives us variable bandwith heating and cooling.

The extremes of temperature are completely adjustable, the fan speed, and starting and stopping of the chillers and boiler are all controlled by demand on the system.

Our electric and gas consumption have dropped by about half and even with rate increases, we have been able to realize cash savings of $17,000

in the first 12 months of the program. This was the result of a $5,600 expenditure in additional climate controls. In times when we can all use extra cash, or must cut budgets, energy conservation and investment in advertising are two possible techniques to explore.

> "The Strasenburgh Planetarium has found that newspaper ads like these are a good investment and attendance is soaring at the Rochester, New York facility".


COSMIC MYSTERIES
narrated by LEONARD NIMOY
Mon.-Fri. 2:00, 8:00 PM
Sat. & Sun. 1:30, 3:45, 8:00 PM
Adults: $1.75 Student: $1.25 Child: $.50
Strasenburgh Planetarium
Rochester Museum and Science Center 657 East Avenue
SHOW INFORMATION: 442-7171
RESERVATIONS RECOMMENDED: 244-6060
Children under 5 not admitted

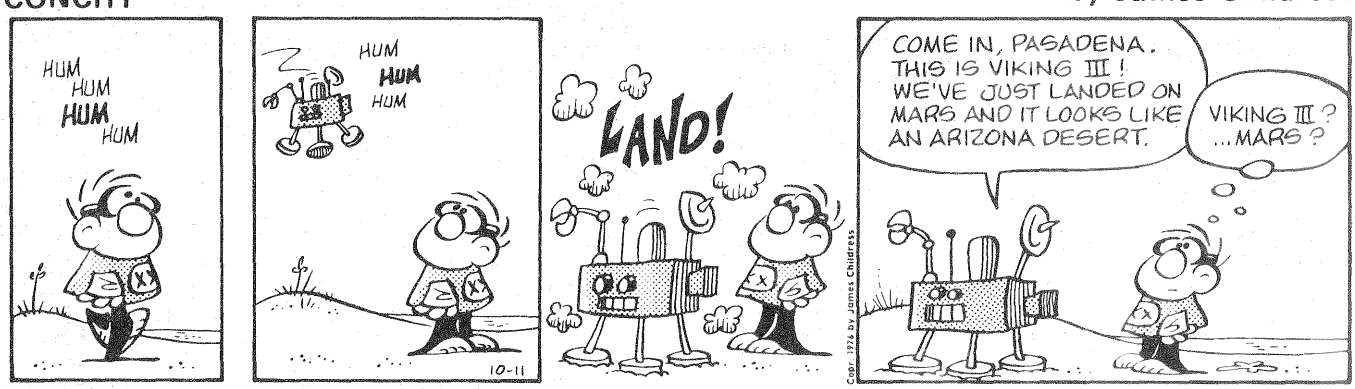
As our earthly frontiers have vanished, new eyes of glass and steel look skyward, and again the question is posed
ARE WE ALONE?
ENCOUNTER
PERFORMANCES:
Weekdays 8:00 pm
Saturday 1:30, 2:30, 3:30, 8:00 pm
Sunday 1:30, 2:30, 3:30, 4:30, 8:00 pm
RESERVATIONS RECOMMENDED: 244-6060
SHOW INFORMATION: 442-7171
Adults: $1.75 Student: $1.25 Child: $.50
Children under 5 not admitted.
SKY INFORMATION: 244-6490
Strasenburgh Planetarium
OF THE ROCHESTER MUSEUM and SCIENCE CENTER
663 East Avenue

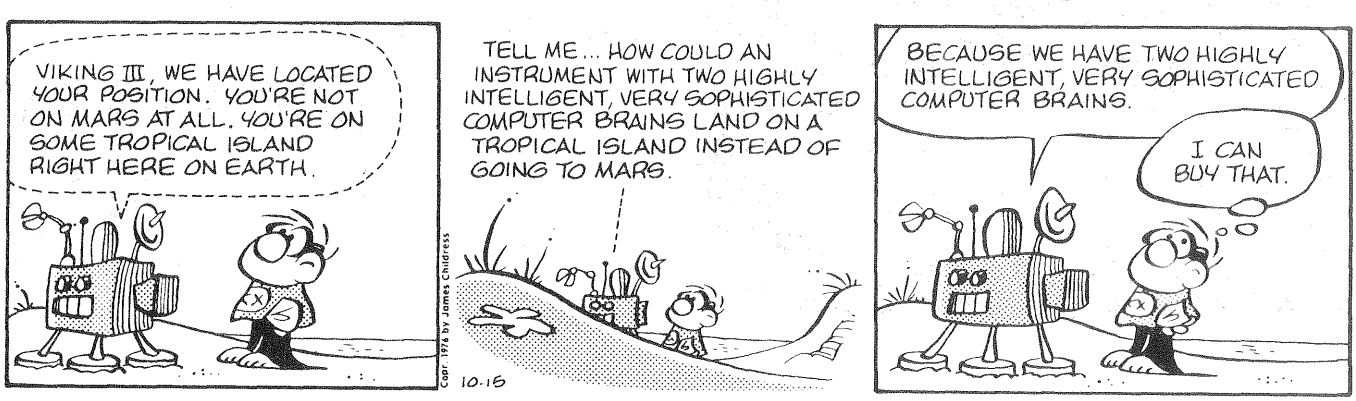
JANE'S CORNER

By Jane P. Geoghegan

In some strange, as-yet-unimagined way, man's landing on the moon may be the most significant event of this century. Six years later, we are still "thinking on it," evaluating its impact on mankind. To people who like to "think on things," it seems that the Viking landing on Mars this past summer comes too soon. In musing with finality on the ultimate outcome of all this, James Childress, creator of the "Conchy" comic strip, explains what happens to Viking III:

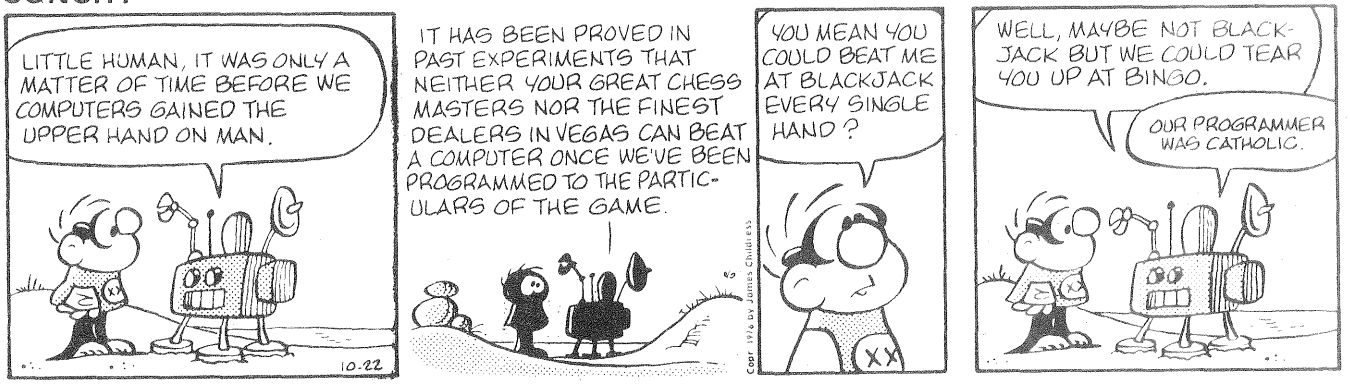
CONCHY **by James Childress**




VIKING III, WE HAVE LOCATED YOUR POSITION. YOU'RE NOT ON MARS AT ALL. YOU'RE ON SOME TROPICAL ISLAND RIGHT HERE ON EARTH.
TELL ME... HOW COULD AN INSTRUMENT WITH TWO HIGHLY INTELLIGENT, VERY SOPHISTICATED COMPUTER BRAINS LAND ON A TROPICAL ISLAND INSTEAD OF GOING TO MARS.
10-16
Copr. 1976 by James Childress
BECAUSE WE HAVE TWO HIGHLY INTELLIGENT, VERY SOPHISTICATED COMPUTER BRAINS.
I CAN BUY THAT.

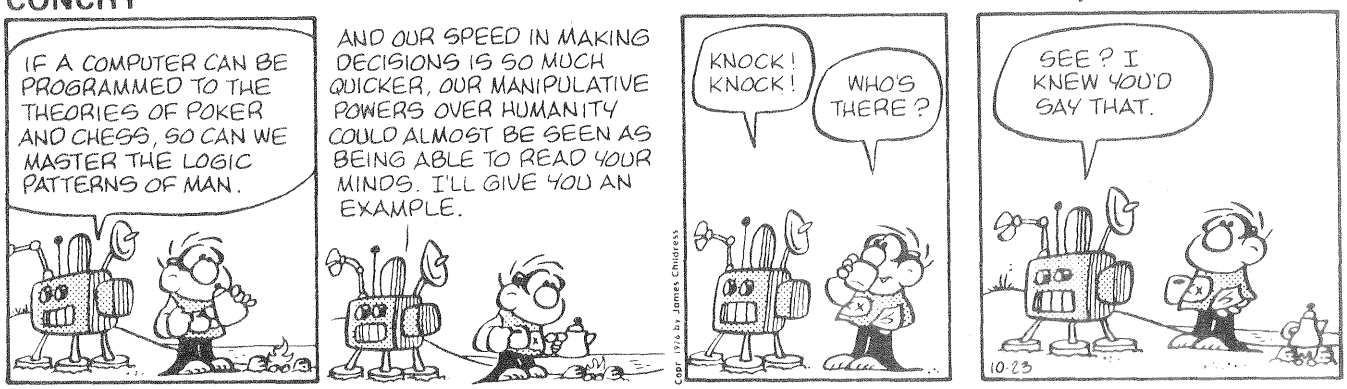
CONCHY

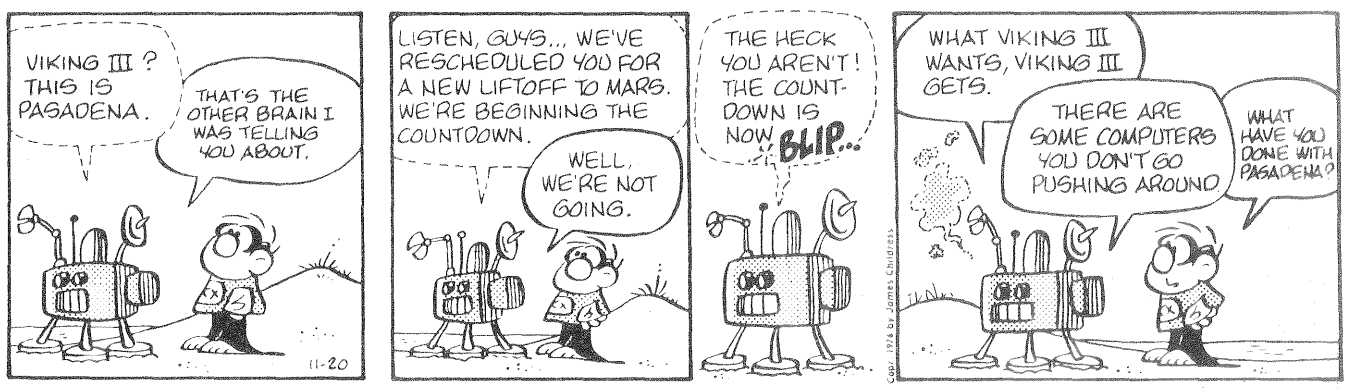
by James Childress


LITTLE HUMAN, IT WAS ONLY A MATTER OF TIME BEFORE WE COMPUTERS GAINED THE UPPER HAND ON MAN.
10-22
IT HAS BEEN PROVED IN PAST EXPERIMENTS THAT NEITHER YOUR GREAT CHESS MASTERS NOR THE FINEST DEALERS IN VEGAS CAN BEAT A COMPUTER ONCE WE'VE BEEN PROGRAMMED TO THE PARTICULARS OF THE GAME.
YOU MEAN YOU COULD BEAT ME AT BLACKJACK EVERY SINGLE HAND ?
XX
WELL, MAYBE NOT BLACKJACK BUT WE COULD TEAR YOU UP AT BINGO.
OUR PROGRAMMER WAS CATHOLIC.
Copr. 1976 by James Childress

CONCHY

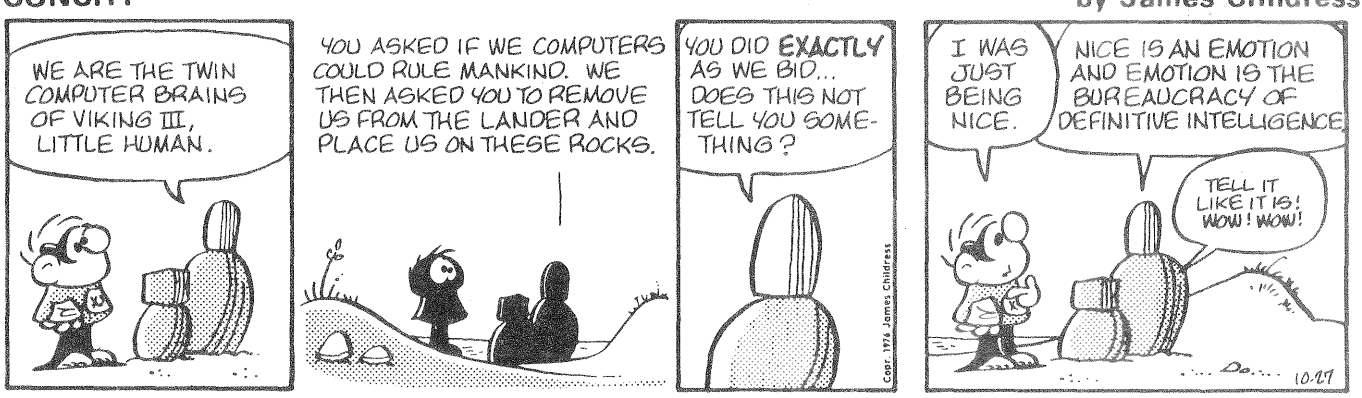
by James Childress


IF A COMPUTER CAN BE PROGRAMMED TO THE THEORIES OF POKER AND CHESS, SO CAN WE MASTER THE LOGIC PATTERNS OF MAN.
AND OUR SPEED IN MAKING DECISIONS IS SO MUCH QUICKER, OUR MANIPULATIVE POWERS OVER HUMANITY COULD ALMOST BE SEEN AS BEING ABLE TO READ YOUR MINDS. I'LL GIVE YOU AN EXAMPLE.
KNOCK! KNOCK!
WHO'S THERE ?
SEE ? I KNEW YOU'D SAY THAT.
10-23
Copr. 1976 by James Childress

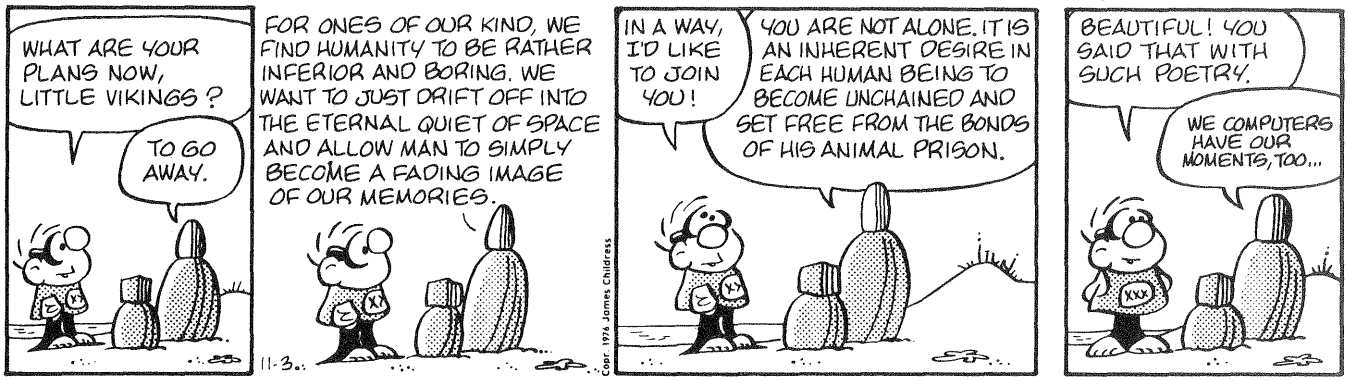

VIKING III ? THIS IS PASADENA.
THAT'S THE OTHER BRAIN I WAS TELLING YOU ABOUT.
11-20
LISTEN, GUYS,,, WE'VE RESCHEDULED YOU FOR A NEW LIFTOFF TO MARS. WE'RE BEGINNING THE COUNTDOWN.
WELL, WE'RE NOT GOING.
THE HECK YOU AREN'T ! THE COUNTDOWN IS NOW BLIP...
WHAT VIKING III WANTS, VIKING III GETS.
THERE ARE SOME COMPUTERS YOU DON'T GO PUSHING AROUND
WHAT HAVE YOU DONE WITH PASADENA?
Copr. 1976 by James Childress

CONCHY

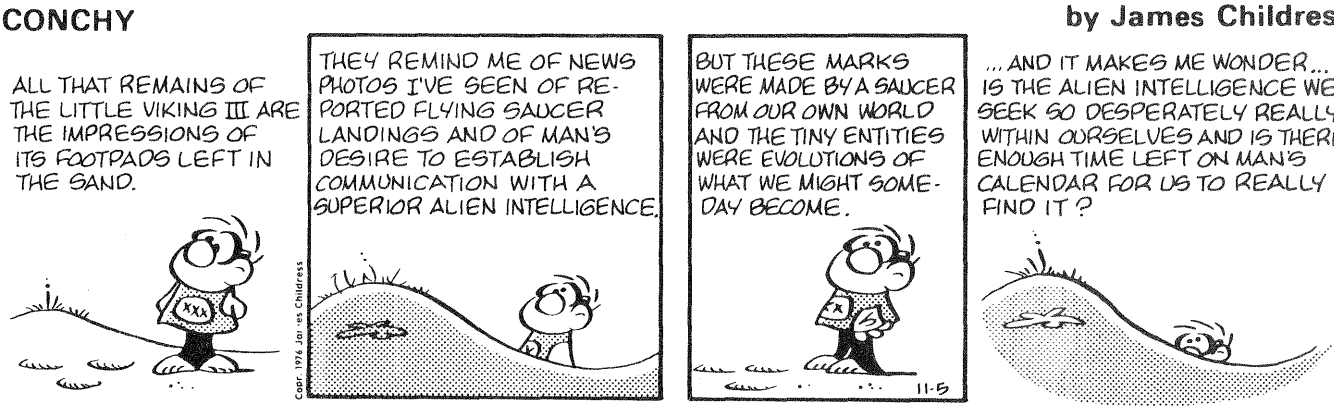
by James Childress


WE ARE THE TWIN COMPUTER BRAINS OF VIKING III, LITTLE HUMAN.
YOU ASKED IF WE COMPUTERS COULD RULE MANKIND. WE THEN ASKED YOU TO REMOVE US FROM THE LANDER AND PLACE US ON THESE ROCKS.
YOU DID EXACTLY AS WE BID... DOES THIS NOT TELL YOU SOMETHING ?
I WAS JUST BEING NICE.
NICE IS AN EMOTION AND EMOTION IS THE BUREAUCRACY OF DEFINITIVE INTELLIGENCE.
TELL IT LIKE IT IS! WOW! WOW!
10-27
Copr. 1976 James Childress

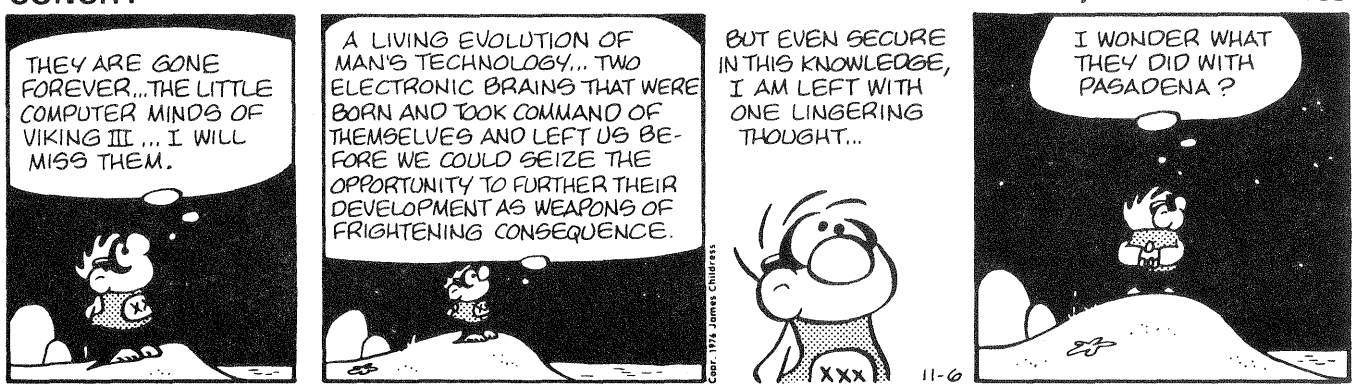
CONCHY **by James Childress**


WHAT ARE YOUR PLANS NOW, LITTLE VIKINGS ?
TO GO AWAY.
FOR ONES OF OUR KIND, WE FIND HUMANITY TO BE RATHER INFERIOR AND BORING. WE WANT TO JUST DRIFT OFF INTO THE ETERNAL QUIET OF SPACE AND ALLOW MAN TO SIMPLY BECOME A FADING IMAGE OF OUR MEMORIES.
11-3
IN A WAY, I'D LIKE TO JOIN YOU!
YOU ARE NOT ALONE. IT IS AN INHERENT DESIRE IN EACH HUMAN BEING TO BECOME UNCHAINED AND SET FREE FROM THE BONDS OF HIS ANIMAL PRISON.
Copr. 1976 James Childress
BEAUTIFUL! YOU SAID THAT WITH SUCH POETRY.
WE COMPUTERS HAVE OUR MOMENTS, TOO...

CONCHY **by James Childress**


ALL THAT REMAINS OF THE LITTLE VIKING III ARE THE IMPRESSIONS OF ITS FOOTPADS LEFT IN THE SAND.
THEY REMIND ME OF NEWS PHOTOS I'VE SEEN OF REPORTED FLYING SAUCER LANDINGS AND OF MAN'S DESIRE TO ESTABLISH COMMUNICATION WITH A SUPERIOR ALIEN INTELLIGENCE.
Copr. 1976 James Childress
BUT THESE MARKS WERE MADE BY A SAUCER FROM OUR OWN WORLD AND THE TINY ENTITIES WERE EVOLUTIONS OF WHAT WE MIGHT SOMEDAY BECOME.
11-5
... AND IT MAKES ME WONDER... IS THE ALIEN INTELLIGENCE WE SEEK SO DESPERATELY REALLY WITHIN OURSELVES AND IS THERE ENOUGH TIME LEFT ON MAN'S CALENDAR FOR US TO REALLY FIND IT ?

CONCHY **by James Childress**


THEY ARE GONE FOREVER... THE LITTLE COMPUTER MINDS OF VIKING III ... I WILL MISS THEM.
A LIVING EVOLUTION OF MAN'S TECHNOLOGY... TWO ELECTRONIC BRAINS THAT WERE BORN AND TOOK COMMAND OF THEMSELVES AND LEFT US BEFORE WE COULD SEIZE THE OPPORTUNITY TO FURTHER THEIR DEVELOPMENT AS WEAPONS OF FRIGHTENING CONSEQUENCE.
Copr. 1976 James Childress
BUT EVEN SECURE IN THIS KNOWLEDGE, I AM LEFT WITH ONE LINGERING THOUGHT...
11-6
I WONDER WHAT THEY DID WITH PASADENA ?

REPRINTED WITH PERMISSION OF JAMES CHILDRESS